FORM PTO-1390 (REV. 9-2001) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		**638.41006X00 filed December 28, 2001**
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) **10/019399**
INTERNATIONAL APPLICATION NO. **PCT/EP00/05664**	INTERNATIONAL FILING DATE **June 20, 2000**	PRIORITY DATE CLAIMED **June 29, 1999**

TITLE OF INVENTION
FORM OF A PRINTING ELEMENT IN AN OFFSET PRINTING PROCESS

APPLICANT(S) FOR DO/EO/US
THOMAS, HANY

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)))
   a. ☐ is transmitted hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office(RO/US)
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☒ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: **Figs. 1-5, Credit Card Payment Form, International Publication No. WO 01/00422-coversheet, International Preliminary Examination Report**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/019399	PCT/EP00/05664	638.41006X00

21. The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a) (1) - (5)):

☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**

☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**

☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**

☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**

☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**

	CALCULATIONS PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =	**$890.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	15- 20 =	0	x **$18.00**	$	
Independent Claims	1- 3 =	0	x **$84.00**	$	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ **$280.00**	**$280.00**	
TOTAL OF ABOVE CALCULATIONS =				**$1,170.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.			+	$	
SUBTOTAL =				**$1,170.00**	
Processing fee of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE =				**$1,170.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property			+	$	
TOTAL FEES ENCLOSED =				**$1,170.00**	
				Amount to be refunded:	$
				charged:	$

a. ☐ A check in the amount of $_____ to cover the fees is enclosed.

b. ☐ Please charge my Deposit Account No. **01-2135** in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposition Account No. **01-2135**. A duplicate copy of this sheet is enclosed.

d. ☒ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

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NAME

32,087
REGISTRATION NO.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

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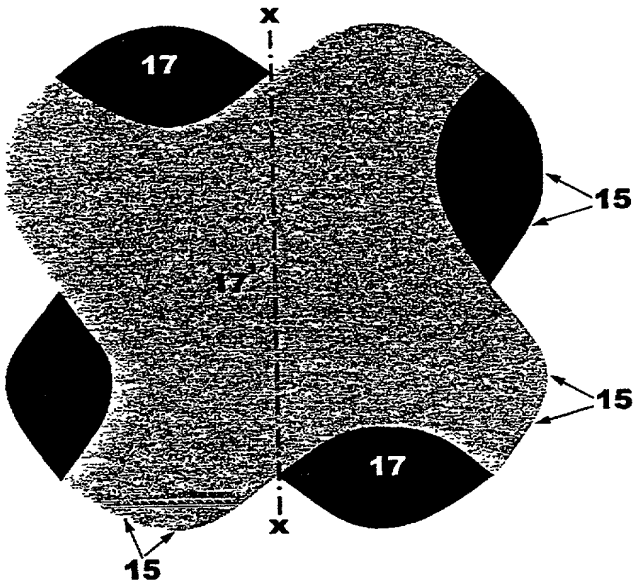
[Fortsetzung auf der nächsten Seite]

(54) Title: FORM OF A PRINTING ELEMENT IN AN OFFSET PRINTING PROCESS

(54) Bezeichnung: FORM EINES DRUCKELEMENTES BEIM OFFSET-DRUCKVERFAHREN



(57) Abstract: The printing element has the shape of a propeller. All printing elements of a printing dot have S-shaped and equally large sides all around. The clearings between adjacent printing elements have a constant width around a printing element. Due to said configuration, it is possible to mirror the printing element around a central axis while preserving the form of a printing element in such a way that only round corners are obtained since sharp corners would provoke an unstable image causing moiré effects. Said printing element form is particularly useful in four-color printing.

[Fortsetzung auf der nachsten Seite]

WO 01/00422 A1

5/prts

The invention relates to a form for a printing element which is one of a plurality of printing elements, separated from one another all round by lands, on a printing unit in an offset printing process such as, in particular, rotary offset printing, the printing element being in each case of a geometric, polygonal shape.

Since printing surface production began there has been a desire in the case of the offset printing process not to use photomechanical screens and instead to imitate the old, unscreened lithography or at least to achieve the closest possible approach to it. With the development of photolithography it became increasingly clear that though printing of relatively high quality could be obtained with screens of conventional design, it was not possible to imitate the old lithographic prints. Photomechanical screens, such as the gradar screen or magenta screen for example, were very good for the recently developed photolithography and also for printing surface production but screens of this type do suffer from certain technical shortcomings such as line breakdowns, moiré patterns, secondary moiré patterns and rosetting. There is still a desire for lithography of the original kind, that is to say printing from stone, without a screen and with the only grain being that of the surface of the stone, to be made possible as a printing element for offset printing.

Consequently, the first very general aim exists of producing unscreened lithographs. The first idea was to use the colour grain of a transparency as a basis and to separate out this granulation by means of colour separation and use it as a printing element. This attempt failed due to the inadequacies of the photographic materials used. Some success was achieved with computer programs and PostScript page-description programs. However since these screening programs are subject to a controlled randomness generator, there is the problem that, the

finer the resolution of the units selected, the more difficult is it to calculate the particular gradation curve. Because of this problem screens of this type - such as the Cristall, Diamond or Harlequin HD screens - are not suitable for rotary newspaper printing presses.

A return had to be made to conventional screening for offset printing. In rotary offset printing, a printing plate is mounted on a cylinder under tension. The cylinder co-operates with a further cylinder covered with a rubber blanket and the latter co-operates in turn with an impression cylinder over which the paper to be printed on is fed. The printing points on the printing plate are prepared in such a way that they repel water and accept the greasy printing ink. The non-printing points are prepared to have an affinity for water and they repel the greasy printing ink. In printing, the whole of the printing plate is first dampened, when only the non-printing points that have an affinity for water accept the water. The printing plate, which is thus damp in parts, then travels past inking rollers which transfer the grease-containing ink to the points on the printing plate that are not damp. The image to be printed is then transferred to the blanket cylinder and from there to the paper to be printed on.

The points in a printed image which are to be inked are split up into printing elements which cannot be seen by the naked eye. Each printing element is separated from the adjoining ones by lands. The lands are not inked. The greater the total area of the lands is in a dot in the image, the lighter the dot appears to be. The proportion that the inked area represents of the total area of a dot in the image defines a grey value, the half-tone value of the dot, and is normally given as a percentage.

By means of a screen having a plurality of printing elements distributed over it, it is possible, by varying the

size of the printing elements, to simulate different half-tone values. It is known for the printing elements to take the form of squares, semicircular areas, or elliptical or other geometrical areas. Given the fineness that is possible in technical terms, the sharpness of the outlines in images has not been entirely satisfactory with the known forms of printing element. This is due to the fact that even when the printing elements are of only medium size, i.e. when the relevant region of the image is of medium half-tone value, there is some join-up between the dots, thus making the sharpness of outline and the graduations of the shadows in the printed image unsatisfactory. In the form of printing element that needs to be found, the dot join-up needs to be positioned to the "rear", in the direction where the shadow lies, as far as possible, and it needs to be possible for the new form of printing element to be controlled perfectly via gradation curves.

One solution to this problem is known from the form of printing element detailed in EP A 0 825 490. The imaginary screen cells are arranged in a chessboard pattern and in each of them is a arranged a printing element, so that, if a tonal value, whatever it may be, remains constant across the screen cells, the shortest distance to the adjoining printing element is of at least approximately the same size for all points on the boundary lines of a printing element. In this case the printing element is to have a substantially rhomboid area, the boundary lines of which extend in curves in such a way that they form two diagonally opposed acute angles and two diagonally opposed rounded or obtuse angles. A printing element in the form of a flag is thus formed.

The advantage that this form of printing element and its arrangement in the screen has is that, purely in theory, join-up between the dots does not take place until a half-tone value of 100%. Although this form of printing element was developed

specifically for four-colour printing, Moiré patterning continues to be a disadvantage in coloured illustrations. This phenomenon can only be avoided if, for another colour such as cyan, magenta or yellow, the printing elements are rotated about their centre axis from their normal arrangement for black, which is a very laborious operation in the regulating software.

The object on which the invention is based is to develop a new form of printing element with which even sharper reproduction and even finer, softer graduations in the shadows are possible, but in particular with which Moiré patterns do not occur in coloured prints, and of course while using only one and the same form for a printing element.

Starting from the experience gained with the printing element detailed in EP A 0 825 490, what is proposed as a way of achieving the stated object is that the given printing element be bounded in each case by S-shaped lines alone and the lines include an angle $\leq 90°$ at all the corners of the printing element. It is particularly useful in this case if the printing element is bounded not only by three but rather by four lines, because what is then obtained is a sort of propeller figuration having gentle, swept S-shaped lines. A clearly definable geometrical form of printing element has thus been found.

The special advantage that this figuration for a printing element has is that if the propeller is mirrored in a direction transverse to an axis running through the centre and the points of reversal and between the opposing valley and hump lines, a printing element of the same size and form is obtained. If the mirrored printing element is then coloured in a different colour, preferably in magenta as a combination colour in the case of black and in yellow as a combination colour in the case of cyan, no Moiré patterns whatever occur, which is a considerable advantage for four-colour printing. Hence the rotation of the printing element which is needed with the flag

printing element to avoid Moiré patterns is unnecessary when using this propeller printing element and in this case it is only the mirrored propeller that must be used for the other colour, something which can be set without any problems with the existing software. This printing element can be used for frequencies in the range from 152 to 304 lpi.

The printing element can of course be used for four-colour printing even without the mirroring. To avoid Moiré patterns in this case the printing element has to be rotated about its central axis as known previously.

So that the printed image can have different graduations of lightness, i.e. a varying tonal value, the printing elements need to be separated from the adjoining one by an area which is not inked. In the layout envisaged in the present application, these (white) areas are always in the form of lines of constant width, in such a way that the printing elements which are arranged next to one another in the screen - without being arranged in a chessboard pattern - are so associated with one another that, at any tonal value, and even when the tonal value varies, the distances between the two adjoining sides and the next printing element are constant along the length of the side. This arrangement is a prerequisite for dot join-up between the printing elements which in each case adjoin one another not to occur until a half-tone value of approximately 100%. The result of this arrangement is soft differences in lightness and outlines of optimum sharpness in images produced with the present printing element.

Hence the present printing element can be used with advantage especially for coloured reproductions in newspaper, web-fed or sheet-fed offset printing

The form of the printing element according to the invention is shown by way of example in the drawings. In the drawings:

Fig.1 is a diagrammatic section through the cylinders of a known offset printing unit,

Fig.2 is a plan view to a very much enlarged scale of a single propeller printing element,

Fig.3 shows a printing element as shown in Fig.2 together with a mirroring about an axis X - X passing through the centre of the printing element,

Fig.4 shows, to a somewhat reduced scale, a number of printing elements of the same tonal value arranged next to one another, and

Fig.5 shows to an enlarged scale but one which is smaller than that in Fig.2 or 3, a number of printing elements of different sizes, i.e. of varying tonal value.

The offset printing unit shown in Fig.1 employs a plate cylinder 1 on which a printing plate 2 is mounted under tension. Plate cylinder 1 co-operates on the one hand with a blanket cylinder 3 and the latter in turn with an impression cylinder 5 against which is held a print substrate to be printed on, such as paper 4, and on the other hand with an inking system 6 and damping system 7. The printing ink 60 is transferred to the printing plate 2 by the inking system 6 via a number of pressure rollers 8. The water 70 is transferred by the damping system 7 via a number of further transfer rollers 9. All the rollers and cylinders operate in the opposite direction from one another, as is indicated for some of them by the arrows.

The damping system 7 transfers water 70 to non-printing points 10 on the printing plate 2, whereas the printing points 11 on printing plate 2 remain free of water. The damp points 10 repel the printing ink 60 at the points 12 at which contact is made with the contacting pressure rollers 8 while the printing points 11 accept the printing ink 60. The printing ink 60 is then transferred from printing plate 2 to blanket cylinder 3 and

there forms inked points 11' which are finally printed onto the print substrate 4.

The printing points 11 or inked points 11' are printing elements as shown in Figs.2 and 3. They are very small in practice and cannot be distinguished from one another with the naked eye. Fig.2 is a very much enlarged view of such a printing element in the propeller figuration according to the invention. The propeller has four S-shaped lines 15 all of the same length forming its sides. Each line forming a side begins at the corner with a line descending into a valley 15' and ends with a line descending from a hump 15" or, going in the other direction, starts with a line ascending to a hump 15" and ends with a line ascending from a valley 15'. If the S-shaped lines forming the sides are all the same length, what is obtained at the corners, where a line from a hump that is ending meets a line into a valley that is starting, is an angle of 90°.

With this figuration for the printing element 17, mirroring produces an element which is of the same shape but mirrored and which, when overlaid with the main colour, shows only rounded corners. The prerequisite for this is mirroring of the printing element in a direction transverse to an axis X - X running through the centre and the points of reversal and between the opposing S-shaped lines of a printing element. Figs.3 shows a printing element 17' which has been mirrored in this way and which is, in addition, of the same size in this case. Depending on the mixed colour that is wanted, the sizes of the two printing elements that come together may also be different in practice. What is essential is only that, with the same figuration for the printing elements and thus with no change to the software for producing the printing elements, parts of a printing element is printed unmixed in its own colour, which prevents Moiré patterns. If the requisite corners of the printing element are always round after the mirroring, the Moiré

patterns are avoided without the printing element having to be rotated about its central axis.

As shown in Fig.4, the propeller-shaped printing elements are arranged immediately next to one another in such a way that the distances between the particular two sides of those printing elements that adjoin each other in each case are always constant. The non-printing lands 18 are of a width that is always the same. This is the prerequisite for avoiding dot join-up even at tonal values which are less than 100%. In the case of the propeller-shaped printing element which is arranged over the area of a printing dot with no regard for a chessboard-type layout, there is never any dot join-up unless the particular printing dot is to be printed absolutely black.

Further to the above, reference should be made to Fig.5, where the propeller-shaped printing elements are shown unchanged but the individual distances between the printing elements, i.e. the lands 18, vary in width over the area of Fig.5 or of the printing dot. Hence the tonal value varies as well. The printing dot becomes lighter towards the bottom of the image. The widening of the lands can take place continuously, as seen at the top, or in fairly large percentage steps, as seen at the bottom. The percentage step in the bottom part of the image is only fairly large so as to make it more clearly apparent on this scale.

Claims

1. Printing element for simulating tonal values on a printing substrate having a plurality of printing elements distributed over the area of a printing dot, characterised in that the individual printing element (17, 17') is bounded by S-shaped lines (15) alone and the lines include an angle ≤ 90° at all the corners of the printing element.

2. Printing element according to claim 1, characterised in that the printing element (17, 17') has at least three lines (15) forming its sides.

3. Printing element according to one of the foregoing claims, characterised in that each line (15) forming a side starts at the corner with a line descending into a valley (15') and ends with a line descending from a hump (15") or, the other way round, starts with a line ascending to a hump (15") and ends with a line ascending from a valley (15').

4. Printing element according to one of the foregoing claims, characterised in that the lines forming the sides of the printing element are all the same length.

5. Printing element according to one of the foregoing claims, characterised in that a printing element is bounded by four lines forming sides (Fig.2).

6. Printing element according to claim 5, characterised in that the printing element is in the form of a four-bladed propeller (Figs.2-5) having blades all of the same shape.

7. Printing element particularly according to one of the foregoing claims, characterised in that if the printing element (17') is mirrored in a direction transverse to an axis (X - X) running through the centre and the points of reversal and between the opposing sides, such as S-shaped lines (15), a printing element of the same size and shape is obtained (Fig.3).

8. Printing element according to claim 7, characterised in that in a printing process involving a plurality of colours (four-colour printing) the mirrored form is in each case coloured in a different colour.

9. Printing element according to claim 8, for four-colour printing in the colours black, cyan, magenta and yellow, characterised in that a printing element added to by mirroring is produced by two printing elements of the colours cyan and yellow and on the other hand of the colours magenta and black.

10. Printing element according to claim 8, for four-colour printing in the colours black, cyan, magenta and yellow, characterised in that a printing element added to by mirroring is produced by two printing elements of the colours cyan and magenta and on the other hand of the colours yellow and black.

11. Printing element according to claim 8, for four-colour printing in the colours black, cyan, magenta and yellow, characterised in that a printing element added to by mirroring is produced by the two printing elements of the colours cyan and black and on the other hand of the colours magenta and yellow.

12. Printing element according to one of the foregoing claims, characterised in that a printing element is bounded by six lines forming sides and a plurality of printing elements in a printing dot are associated with one another in propeller form.

13. Printing element according to one of the foregoing claims, characterised in that the printing elements which are arranged next to one another in the printing element - without being arranged in a chessboard pattern - are so associated with one another that, at any tonal value, and even when the tonal value varies, the distances (lands 18) between the two adjoining S-shaped lines forming sides and the next printing element are constant along the length of the S-shaped line forming a side.

14. Printing element according to one of the foregoing claims, characterised in that the four lines forming the sides obey the following formulas:

The formulas relate to the unit area of dimensions x ϵ [-E;E] and y ϵ [-E;E] where E ϵ = [0;+ ∞]. The zero point (0;0) is the centre of the unit area.

For all the radiuses r_i:

$i \epsilon \{1;2;3;4;5;6;7;8]$

$r1 = r2 = r3 = r4 = r5 = r6 = r7 = r8$

$r_i \epsilon [E/2;+\infty]$

For point $(x_1;y_1)$:

$x_1 = E - \sqrt{(r_i 2 - (E/2)^2)}$

$y_1 = E/2$

For point $(x_2;y_2)$:

$x_2 = E/2$

$y_2 = E = \sqrt{(r_i 2 - (E/2)^2)}$

For point $(x_3;y_3)$:

$x_3 = -E/2$

$y_3 = E - \sqrt{(r_i 2 - (E/2)^2)}$

For point $(x_4;y_4)$:

$x_4 = -E - \sqrt{(r_i 2 - (E/2)^2)}$

$y_4 = E/2$

For point $(x_5;y_5)$:

$x_5 = -E + \sqrt{(r_i 2 - (E/2)^2)}$

$y_5 = -E/2$

For point $(x_6;y_6)$:

$x_6 = -E/2$

$y_6 = -E - \sqrt{(r_i 2 - (E/2)^2)}$

For point $(x_7;y_7)$:

$x_7 = -E/2$

$y_7 = -E + \sqrt{(r_i 2 - (E/2)^2)}$

For point $(x_8;y_8)$:

$x_8 = E + \sqrt{(r_i 2 - (E/2)^2)}$

$y_8 = -E/2$

Points $(x_i;y_i)$ are the centres of the respective radiuses r_i.

For all points $(x_i;y_i)$:

$x_i \in [-\infty;+\infty]$

$y_i \in [-\infty;+\infty]$

These formulas are correct for a printing element as shown below:

(see page 11 of German original)

Abstract

The printing element is in the shape of a propeller. All the printing elements in a printing dot have S-shaped sides of equal length all round. The lands between adjoining printing elements are of constant width all round a printing element. Due to this figuration, it is possible for a printing element to be mirrored about a central axis while preserving the form of the printing element, in such a way that only rounded corners are obtained because otherwise pointed corners would produce an erratic image and moiré patterns. This printing element form is thus particularly important for four-colour printing.

$x_i \in [-\infty;+\infty]$
$y_i \in [-\infty;+\infty]$

Diese Formeln sind richtig für ein Druckelement wie folgt:

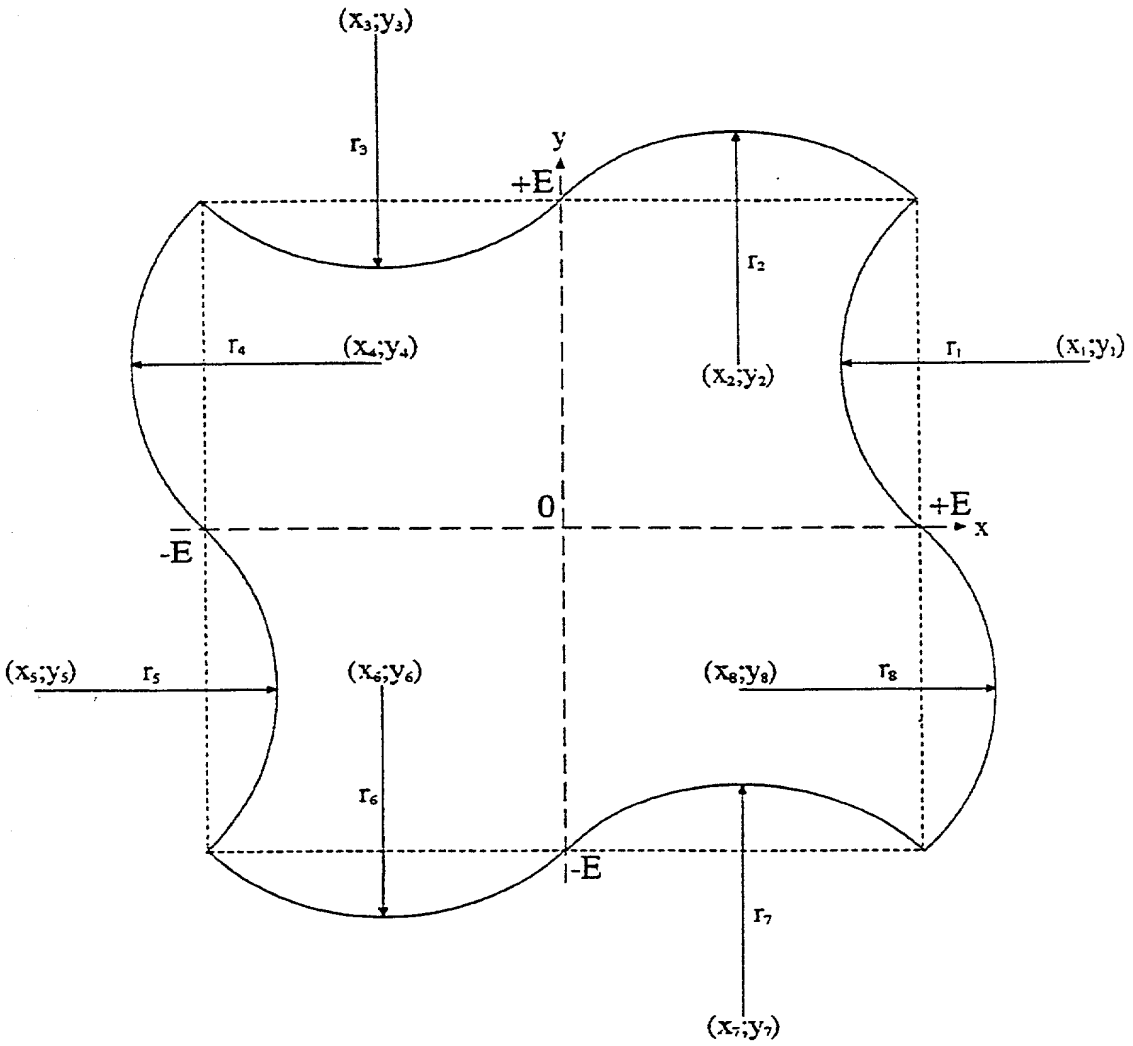
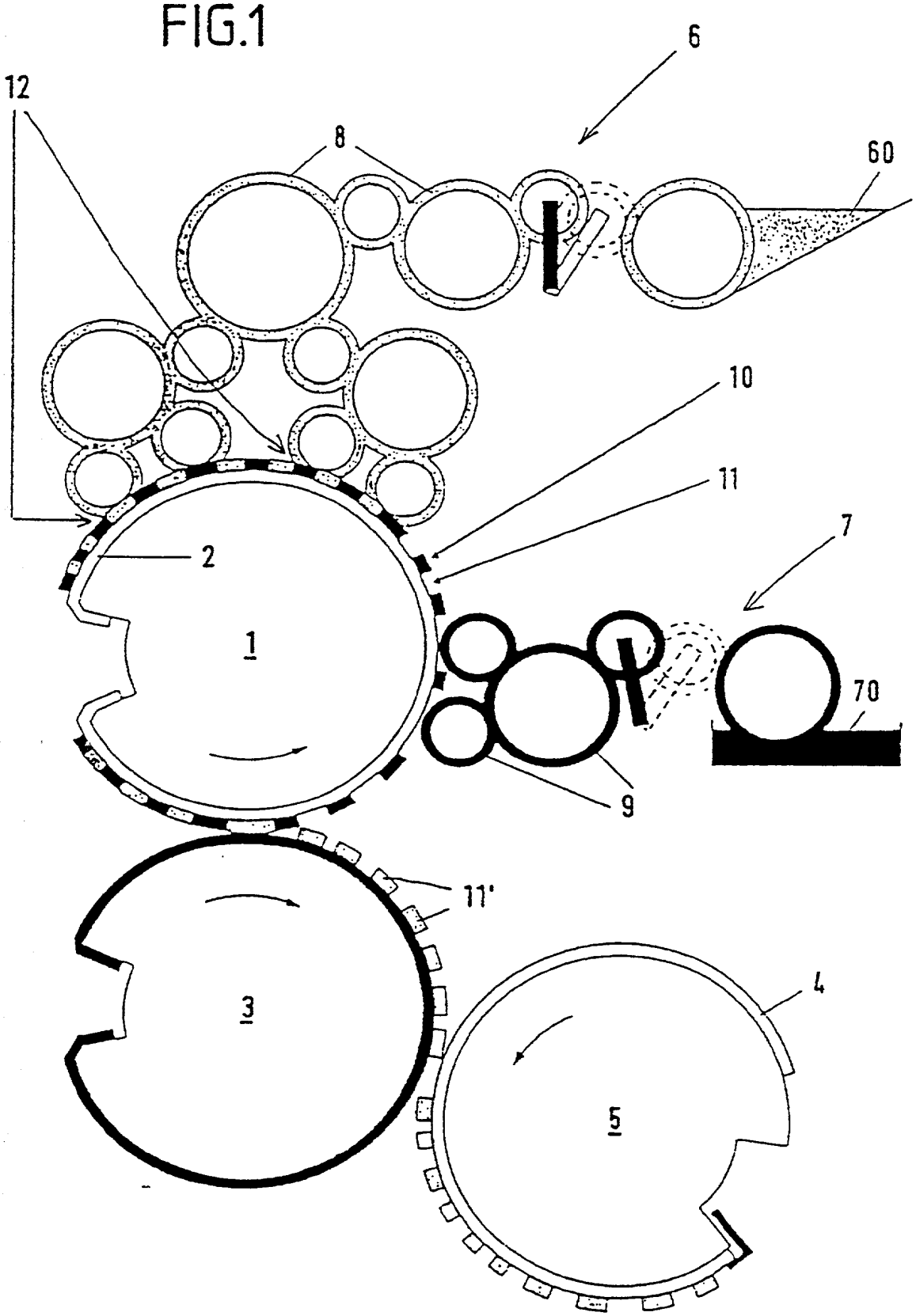


FIG.1



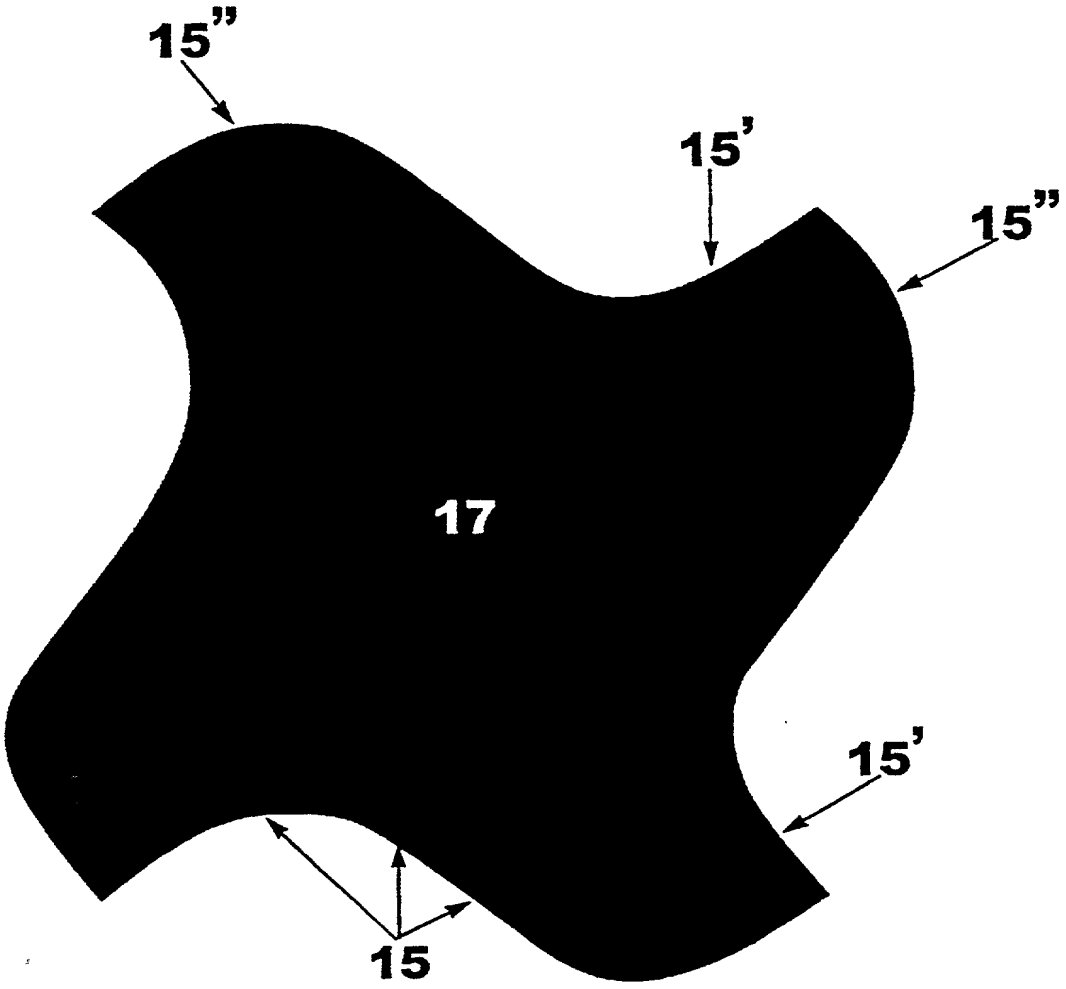


Fig. 2

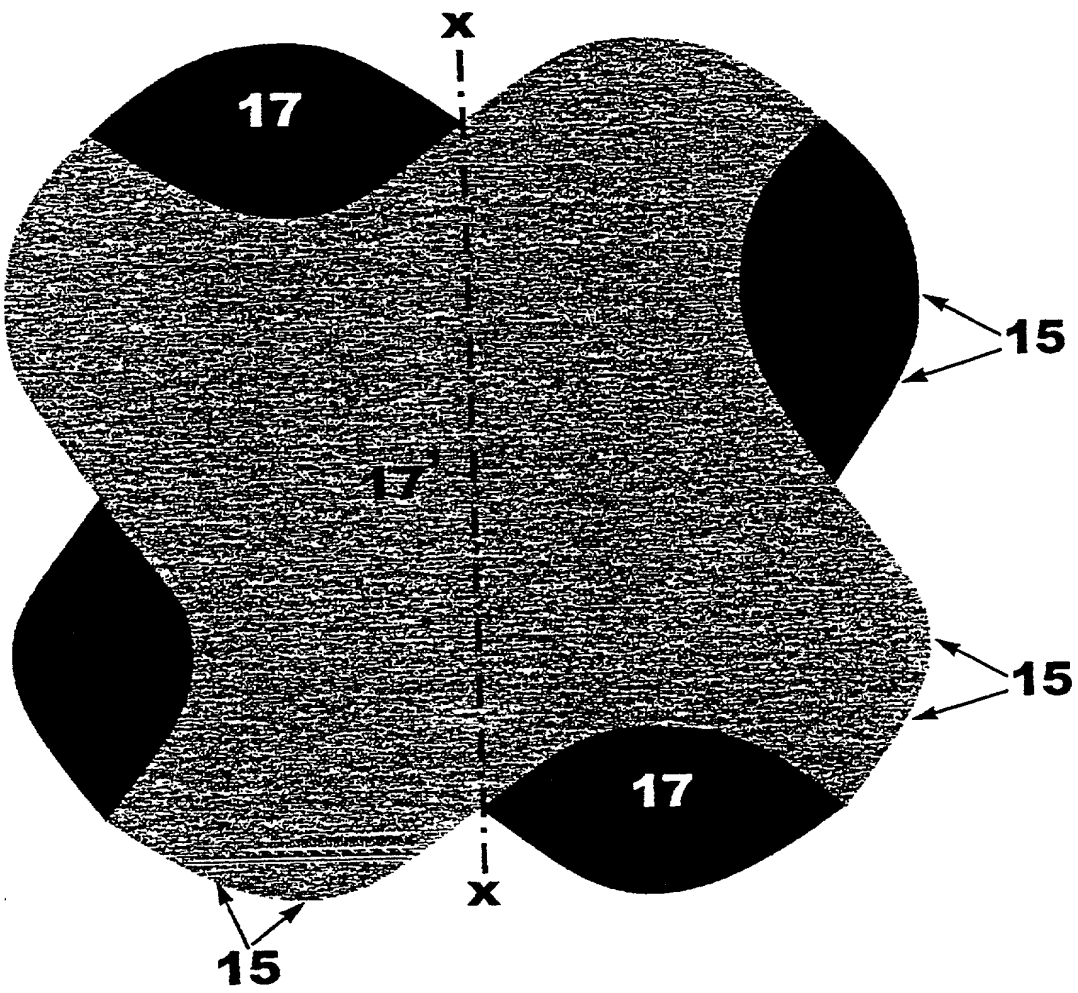


Fig. 3

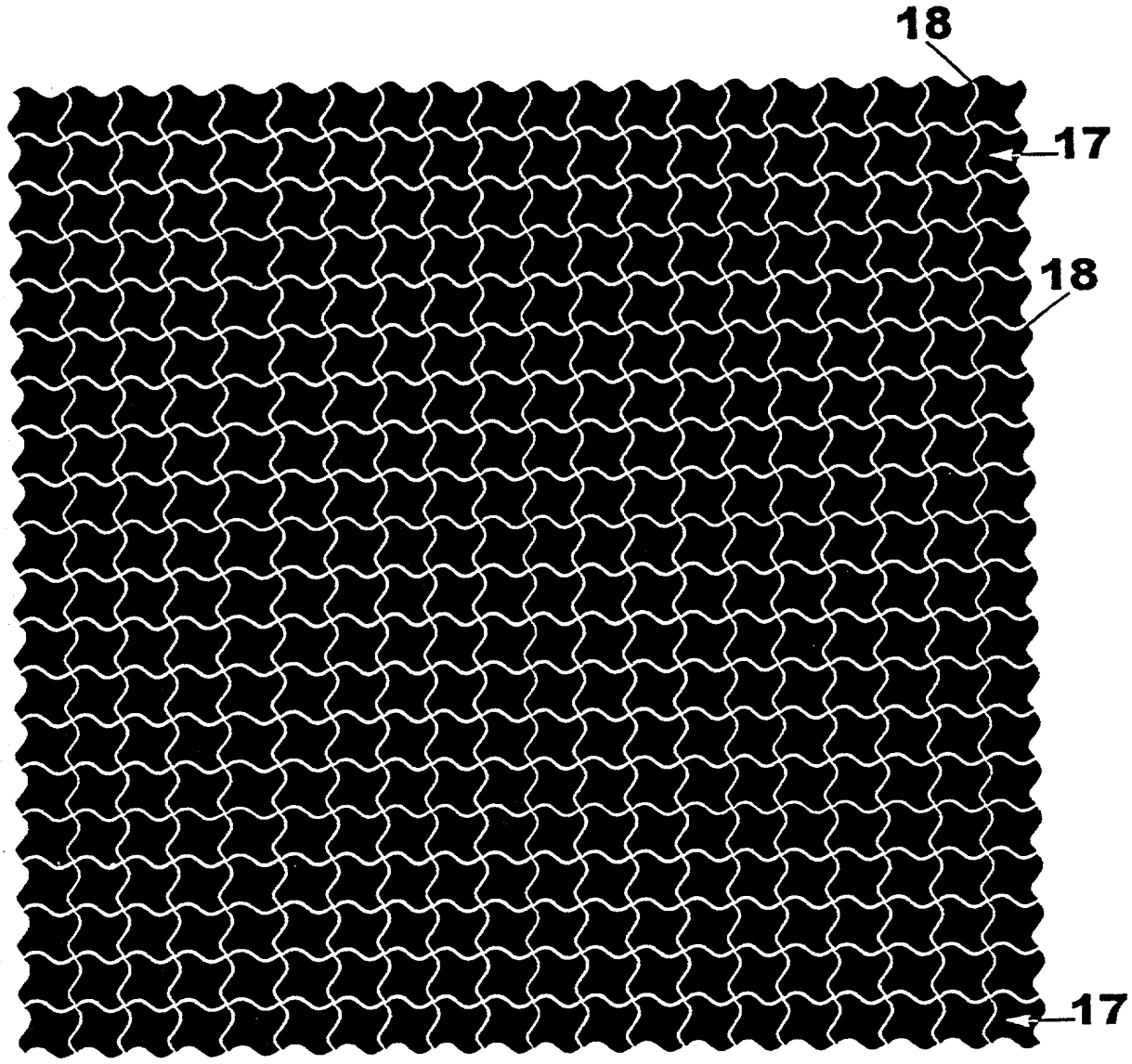


Fig. 4

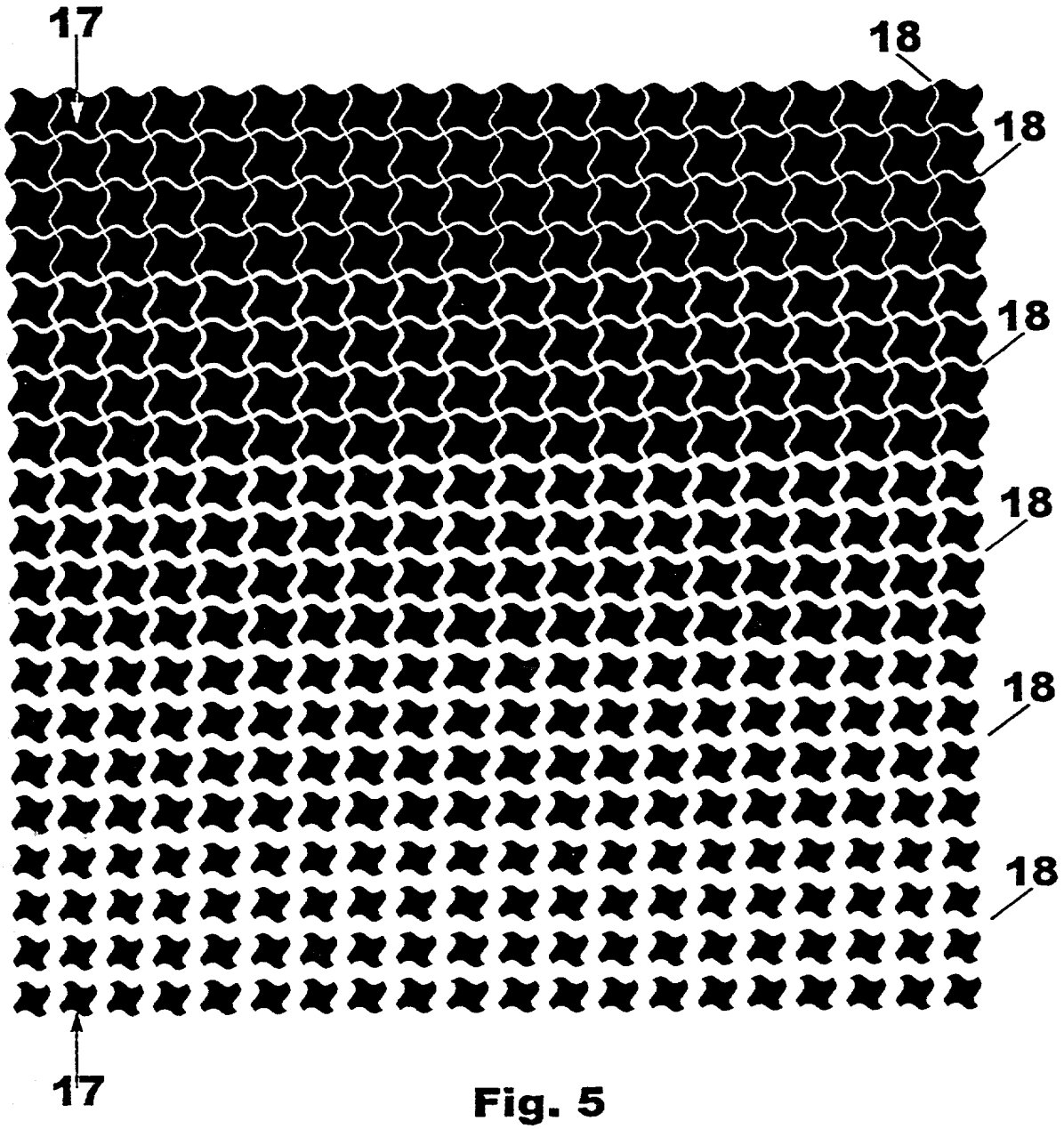


Fig. 5

Attorney's Docket No.: 1151.41006X00

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that: my residence, post office address and country of citizenship are as stated below, next to my name; I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

FORM OF A PRINTING ELEMENT IN AN OFFSET PRINTING

the specification of which

___ is attached hereto.

_X_ was filed on December 28, 2001 as
United States Application Number 10/019,399
or PCT International Application Number PCT/EP00/05664
and was amended on _____.
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
199 29 901.3 (Number)	DE (Country)	29/6/1999 (Day/Month/Year Filed)	___ Yes	___ No
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	___ Yes	___ No

I hereby claim the benefit under title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

_____ (Application Number) _____ Filing Date

_____ (Application Number) _____ Filing Date

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

_____ (Application Number) _____ Filing Date _____ (Status -- patented, pending, abandoned)

Title 37, Code of Federal Regulations, Section 1.56
Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclosure information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclosure all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by ¤¤1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made or record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(Application Number)	Filing Date	(Status -- patented, pending, abandoned)

I hereby appoint: Donald R. Antonelli, Reg. No. 20,296; Melvin Kraus, Reg. No. 22,466; William I. Solomon, Reg. No. 28,565; Gregory E. Montone, Reg. No. 28,141; Ronald J. Shore, Reg. No. 28,577; Donald E. Stout, Reg. No. 26,422; Alan E. Schiavelli, Reg. No. 32,087; James N. Dresser, Reg. No. 22,973; Carl I. Brundidge, Reg. No. 29,621; Paul J. Skwierawski, Reg. No. 32,173; and Robert M. Bauer, Reg. No. 34,487, my attorneys; of ANTONELLI, TERRY, STOUT & KRAUS, LLP with offices located at 1300 North Seventeenth Street, Suite 1800, Arlington, Virginia 22209, telephone: (703) 312-6600, fax: (703) 312-6666; with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's Signature T Häny Date 7.5.2002

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Full Name of Third/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

Post Office Address _____ (City, State) (Country)

_____

Full Name of Fourth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ (City, State) Citizenship _____ (Country)

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Full Name of Fifth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ (City, State) Citizenship _____ (Country)

Post Office Address _____

_____

Full Name of Sixth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ (City, State) Citizenship _____ (Country)

Post Office Address _____

_____

Full Name of Seventh/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ (City, State) Citizenship _____ (Country)

Post Office Address _____

_____

Full Name of Eight/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ (City, State) Citizenship _____ (Country)

Post Office Address _____

_____